

**REMARKS**

Claims 9, 23-25, 31, 34, and 35 were pending in the application. By this paper, no claims have been amended or canceled, and new claims 36 and 37 have been added. Reconsideration and withdrawal of the rejections are hereby respectfully solicited in view of the foregoing amendments, the following remarks, and the attached affidavit of inventor, Stephen Temple.

**Claim Rejections - 35 U.S.C. §112**

Claims 9, 34, and 35 have again been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The applicants again believe this rejection should be withdrawn in view of the following remarks.

Claim 9 is specifically limited to the high energy beam being directed at a first planar reflecting surface arranged so as to reflect the beam toward at least two additional beam reflecting surfaces. These surfaces are specifically recited as arranged to both invert the beam and direct the beam along an axis co-linear with its original first axis. One having ordinary skill in the art will readily see that any arrangement of reflective surfaces *capable of performing the beam redirection, reflection, and inversion* will meet the limitations of this claim. The claim as written is supported by the written description.

One having ordinary skill in the art will readily see that superfluous additional reflecting surfaces can be placed along the path of the beam to further redirect the beam without affecting it being reflected, redirected, and inverted as claimed. For example, if claim 9 were limited to three and only three reflective surfaces, one having ordinary skill in the art could simply repeat the three reflective surface arrangement as many times as needed to achieve the appropriate beam characteristics and yet fall outside of the scope of the claim. Claim 9 will be perfectly clear to those having ordinary skill in the art as to how the reflecting surfaces affect the beam and the resultant output beam characteristics.

Other reflective surface arrangements may also be known or may become known that can accomplish the recited beam redirection, reflection, and inversion. Those having ordinary skill in the art will understand and will readily determine from claim 9 and from the written description that the described arrangement need not be the only exclusive

arrangement to achieve such beam characteristics. There is no requirement that every mode for carrying out an invention be disclosed, but merely that the best mode be disclosed.

The action states that using *four* reflective surfaces could not result in the necessary beam inversion. The applicant counters that claim 9 does not specifically recite *four* surfaces, but instead merely recites a first surface and at least two additional surfaces capable of achieving the desired beam characteristics. This is fully disclosed in the specification. As stated before, one having ordinary skill in the art could perhaps contrive an arrangement of additional surfaces that would still yield the desired beam characteristics. Further, use of four reflective surfaces may not be able to achieve the claimed beam characteristics using current knowledge and technology, but who is to say this could not change?

Claim 9 and corresponding dependent claims 34 and 35 as presently written, are believed to meet the requirements of §112. These claims are supported by the written description and would be clear to one having ordinary skill in the art. This rejection should be withdrawn.

### **Allowable Subject Matter**

The applicants gratefully acknowledge that claim 34 would be allowable if rewritten to overcome the rejections under §112, and to include all of the limitations of the base claim and any intervening claims. New claim 36 has been added herein and recites all of the limitations of claim 9 in combination with allowable claim 34. Claim 36 also specifically recites three reflective surfaces. New claim 37 is identical to claim 35, but for being dependent from new claim 36. Allowance of claims 36 and 37 is respectfully solicited.

### **Claim Rejections - 35 U.S.C. §103**

Claims 9, 23, 24, and 31 having been rejected under 35 U.S.C. §103(a) as obvious over Nishiwaki et al., U.S. Patent No. 5,263,250 (Nishiwaki) in view of Shei et al., U.S. Patent No. 5,569,238 (Shei) and in further view of GB Patent No. 2 262 253 A (Turner). Claims 9, 23, 24, and 31 have alternately been rejected as obvious over Nishiwaki only in view of Turner. Claim 25 has been rejected as obvious over Nishiwaki in view of Shei and Turner, and further in view of Daly, U.S. Patent No. 4,316,074 (Daly), and alternately in view of only Nishiwaki, Turner, and Daly. Similarly, claim 35 has been rejected as obvious

over Nishiwaki, Shei, Turner, and Hizny, U.S. Patent No. 5,048,938 (Hizny), and alternately in view of only Nishiwaki, Turner, and Hizny. The applicants believe that these rejections should be withdrawn in view of the following remarks and the attached declaration of Stephen Temple, one of the inventors of the claimed subject matter in this application.

Reference Combination Destroys Specific Teachings of Nishiwaki

Independent claims 9, 23, and 31 each recite formation of a nozzle in a nozzle plate. Nishiwaki teaches a method specifically discloses *and claims* a method of manufacturing a nozzle plate with a specific desire to simultaneously form a plurality of nozzles at one time and/or a plurality of beams that will be focused on an object to form the plurality of nozzles. The Nishiwaki abstract states an intent to form a plurality of nozzles and that as "a result, a nozzle plate of an inkjet printerhead can be *accurately and quickly manufactured*." Each independent claim recites plural nozzles formed or plural beams formed to create plural nozzles. These specific and intended purposes of Nishiwaki cannot be ignored.

Shei teaches an energy delivery system that produces only a single beam for use in vision correction. Turner discloses laser drilling of reverse tapered holes wherein only a single hole is produced at one time. Ignoring for the moment that both Turner and Shei are from completely unrelated, non-analogous fields, any combination of Nishiwaki, Shei, and Turner would destroy the specific and intended teachings of Nishiwaki to quickly and accurately produce multiple nozzles in a nozzle plate at the same time. This is because, if one were to modify the Nishiwaki process according to the teachings of either Turner or a combination of Shei and Turner, the multiple beam and multiple nozzle forming process and result intended in Nishiwaki would be eliminated. As stated before, both Turner and Shei teach formation of only a single beam to create only a single hole or a single work area.

Thus, any combination of Turner and Shei with Nishiwaki would destroy the teachings of Nishiwaki. The purported alternate combinations of these references are improper as a result. The rejection of the independent claims should be withdrawn at least for this reason.

As further support for this position, the applicants have provided an affidavit of one of the inventors, Stephen Temple. Mr. Temple notes at paragraphs 9, 10, and 16 that both Turner and Shei teach utilizing only a single beam, which can create no more than one hole at

a time. The affidavit of Mr. Temple bolsters the fact that any combination of Nishiwaki with Shei and/or Turner would destroy the teachings of Nishiwaki.

Combinations Fail to Teach or Suggest All Limitations

Turner is a newly cited reference in this application. Turner discloses a laser drilling operation for forming reverse tapered air flow nozzles in an aircraft wing. Figure 4 of Turner clearly illustrates that its optical assembly 8 is rotated about an axis 17 and that its laser beam 18 does not enter or exit the assembly 8 co-linear with the axis 17. Instead, the beam 18, upon exiting the assembly 8, is moving completely around the axis 17 and, thus, forms the hole in the aircraft wing 9 by trepanning. If one were to combine the teachings of Turner with Nishiwaki alone, or with Nishiwaki and Shei, in order to form a reverse tapered hole, the resulting combination would not result in the invention as claimed.

Each of independent claims 9, 23, and 31 specifically recites a tapered nozzle and an assembly that is rotated about an axis, which is the same axis relative to which the nozzle forming beam is co-linear, to form a nozzle. Thus, in each of the claims, the beam is rotated about the same axis as the assembly. Any combination of Turner with Nishiwaki would not result in this limitation of the claims. As a result, the combination of Turner with either Nishiwaki or Nishiwaki and Shei does not teach or suggest all of the limitations of these claims. The rejection of these claims should be withdrawn for at least these reasons.

To further support this position, the attached affidavit of Mr. Temple, at paragraphs 14-16, notes that Turner is in fact employing a spherical lens and trepanning of a single beam to create the envelope of a reverse tapered hole. As discussed above, this is wholly contrary to the invention as claimed. The claimed invention, as Mr. Temple notes, uses a fixed beam width which is rotated about its own axis to produce time-averaged constant energy in all the beamlets issuing from the lens. Once the beamlets are reconverged, the beam does not rotate at all. Thus, the claimed nozzle formed in the nozzle plate is not formed by trepanning, which is quite the opposite of the beam trepanning method of Turner.

Shei and Turner are Non-analogous to the Claimed Invention

As discussed in previous responses, a combination of Nishiwaki and Shei is improper. Further, a combination of Nishiwaki and newly cited Turner is also improper. Nishiwaki is specifically directed to a method of forming nozzles for ejecting *liquid ink* in inkjet

printheads. Both Shei and Turner are from completely different fields and are non-analogous to the present invention.

Shei is specifically directed to an energy delivery system for use in laser eye surgical procedures. Nishiwaki teaches producing holes through a flat plate. Shei teaches reshaping an eyeball, which is a combination of a spherical and a cylindrical (non-flat) surface. Forming a hole in an eyeball would be completely unthinkable in laser eye surgery and would result in catastrophic injury and blindness to the patient. One looking to modify an inkjet nozzle forming process would not think to look to a laser eye surgical procedure as taught by Shei for guidance.

Additionally, Shei describes a method for modulating the fluence in the surgical beams so as to uniformly cut or shape the non-flat, combined spherical and cylindrical surface of the eye. The primary consideration in inkjet nozzle formation is to achieve uniformity of illumination, and thus in the energy across the beam. This again is quite the contrary to the teachings of Shei. An inkjet engineer would simply have no motivation to look to the teachings of Shei in order to modify the method disclosed in Nishiwaki for forming inkjet nozzles. Mr. Temple's affidavit is clear on this point as can be seen in paragraphs 6 and 7 therein.

Similarly, Turner discloses a method of forming air flow nozzles in an aircraft wing. The nozzles are used for perforating an aircraft wing to remove boundary layer across the wing by applying suction to the inner surface of the wing. Ejecting droplets of liquid ink from a nozzle requires completely different considerations in the characteristics of the formed nozzle to achieve precise and accurate ejection of the liquid ink. To the contrary, the Turner nozzles are only for flow of a gas, i.e., air, and are tapered to eliminate clogging at the nozzle inlet.

There would have been no motivation for one having ordinary skill in the art of ink jet to look to the air flow orifice teachings of Turner in order to modify the nozzle forming method of Nishiwaki. Turner is simply from a non-analogous field of endeavor, posing completely different concerns and problems in comparison to the field of ink jet. The combination of Turner and Nishiwaki is improper.

The rejections of independent claims 9, 23, and 31 based on a combination of either Nishiwaki and Turner or Nishiwaki, Shei, and Turner should be withdrawn in accordance with all of the foregoing reasons.

The corresponding dependent claims 24, 25, 34, and 35 should be allowable as depending from allowable base claims.

The teachings of Hizny and Daly fail to provide any of the limitations missing from the aforementioned references, and fail to provide the necessary motivation or suggestion to combine the teachings of Nishiwaki with Shei and/or Turner. As a result, all of the rejections of the pending claims should be withdrawn.

### **CONCLUSION**

Claims 9, 23-25, 31, and 34-37 are in condition for allowance in view of the foregoing remarks. Reconsideration and withdrawal of the various rejections are hereby respectfully solicited.

The examiner is invited to contact the undersigned at the telephone number listed below in order to discuss any remaining issues or matters of form that will place this case in condition for allowance.

A petition for a one-month extension of time and the appropriate fee authorization accompany this paper. No additional fee is believed due at this time. However, the commissioner is also hereby authorized to charge any fee deficiency, or to credit any overpayment, to Deposit Account No. 13-2855 of the undersigned's firm.

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Respectfully submitted,

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